

FIG.1

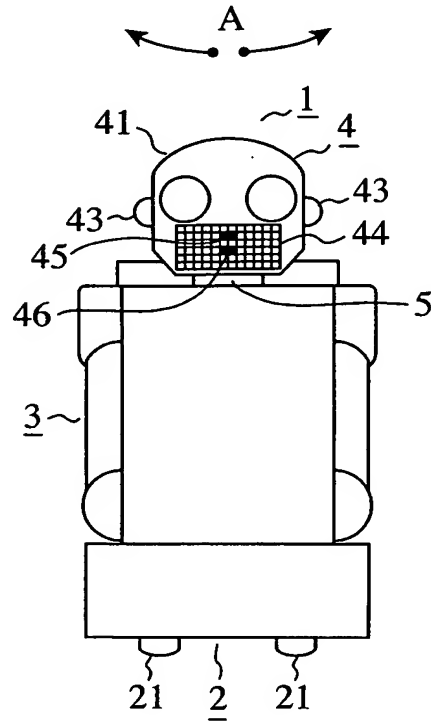


FIG.2

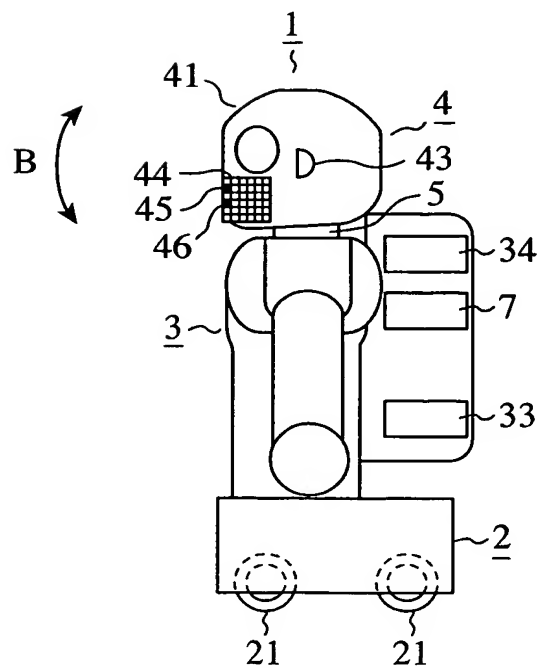


FIG.3

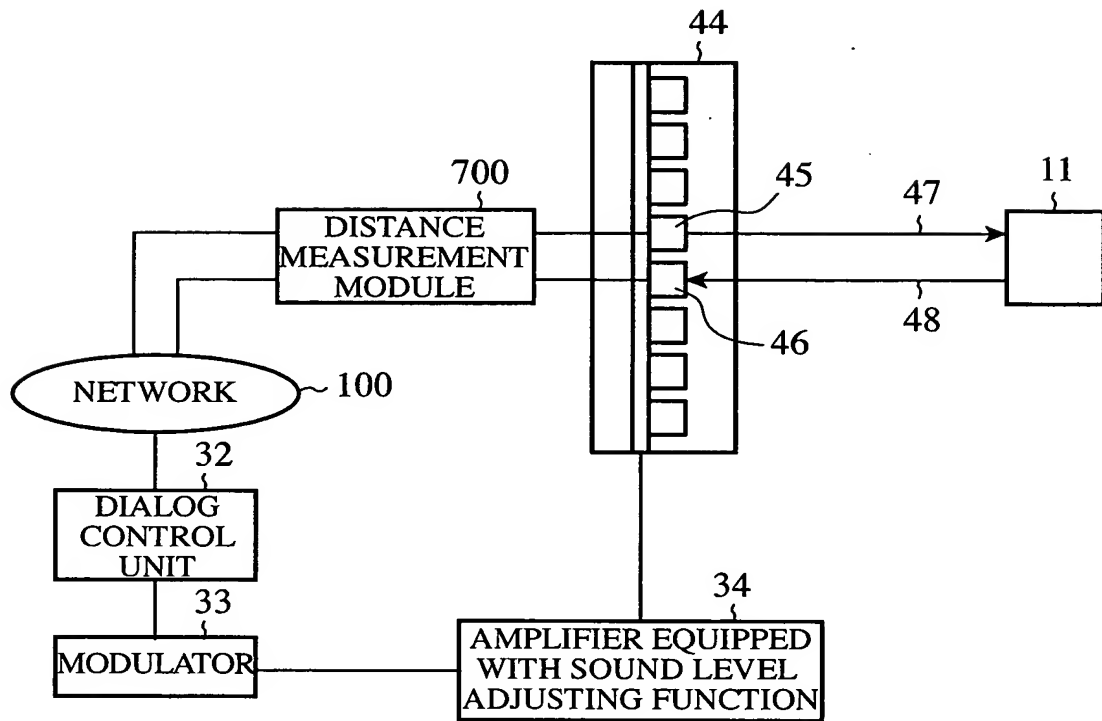


FIG.4

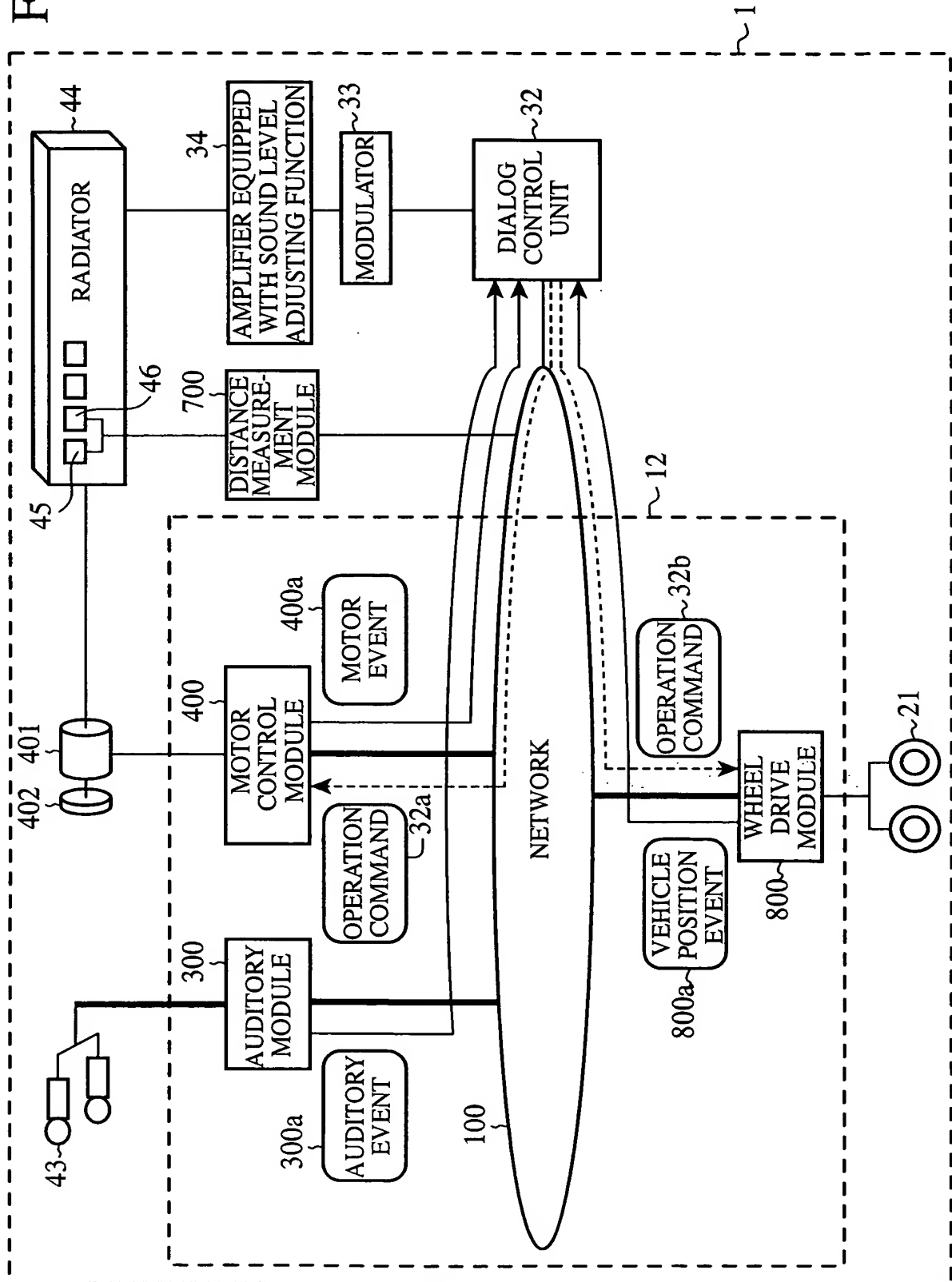


FIG.5

ANGLE OF INCIDENCE = ANGLE OF REFLECTION

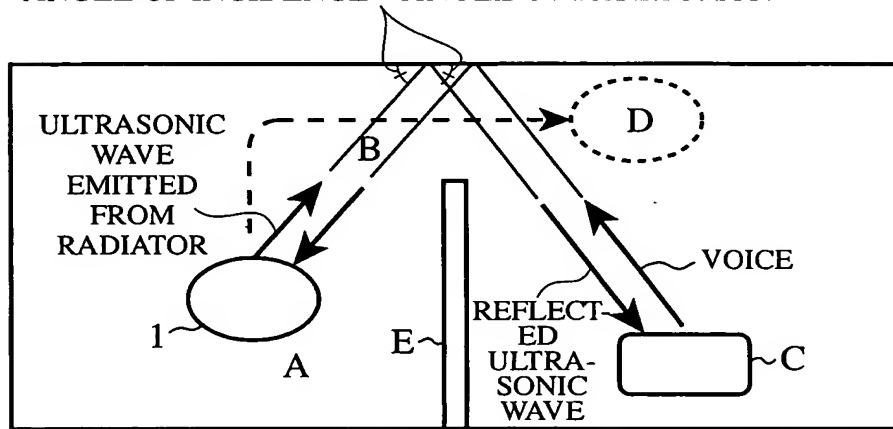


FIG.6

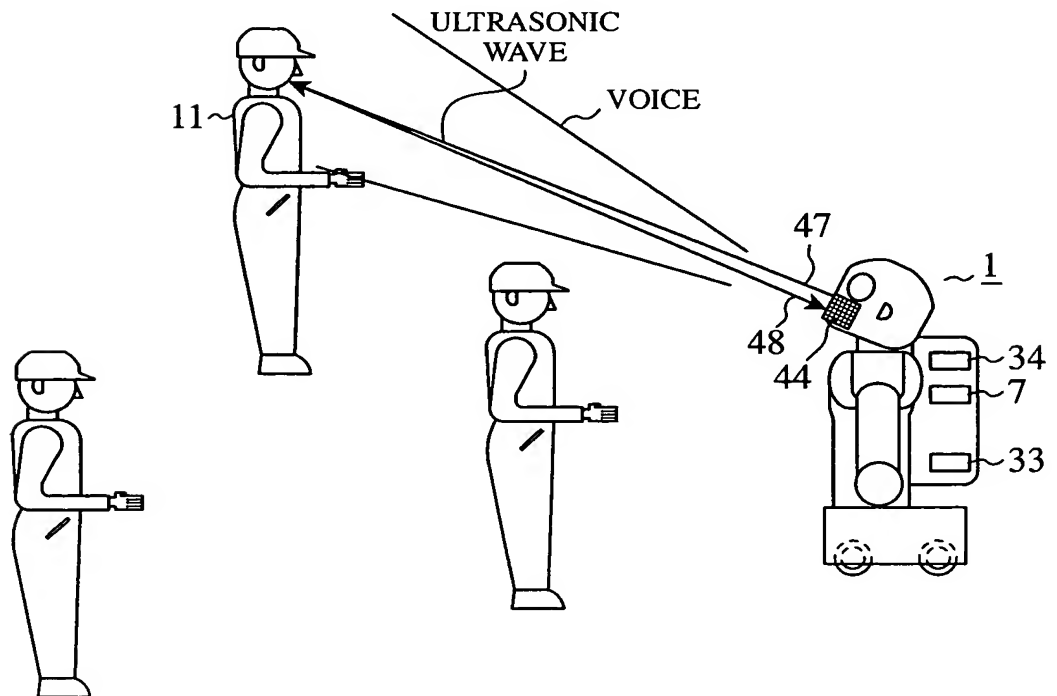


FIG.7

(a) NONDIRECTIONAL SPEAKER (b) ULTRA-DIRECTIONAL SPEAKER

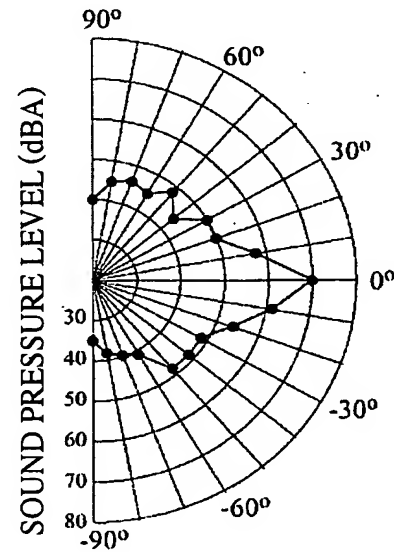
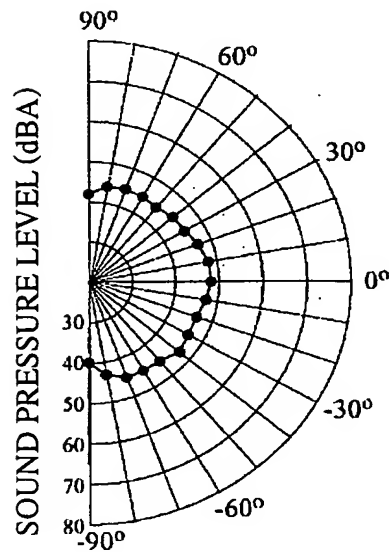
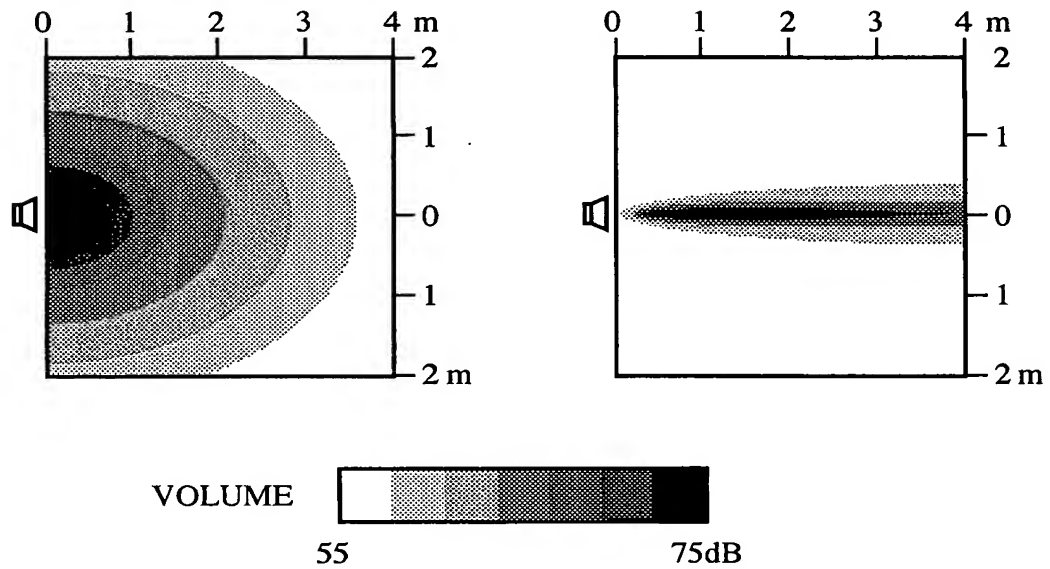


FIG.8

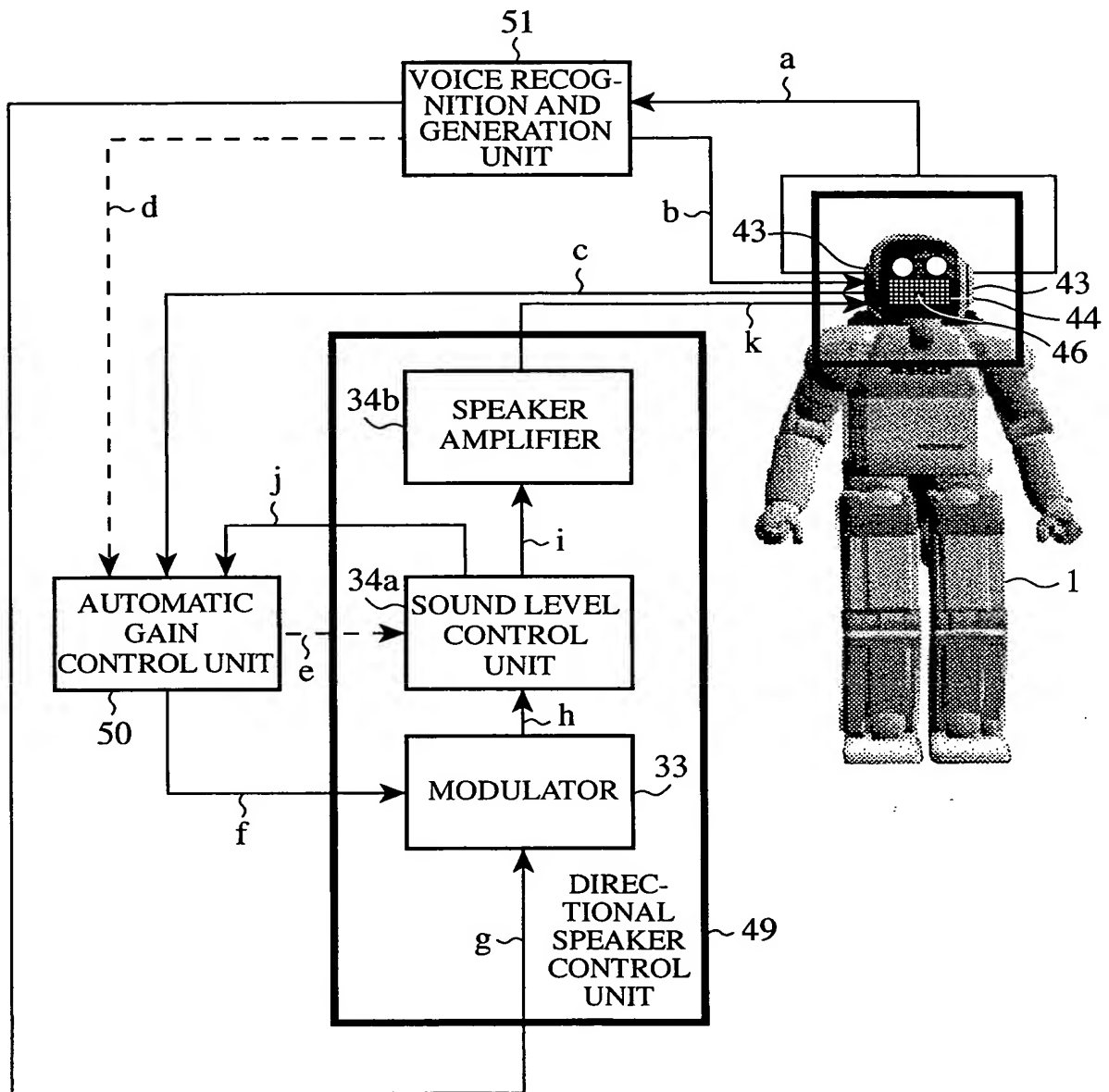


FIG.9

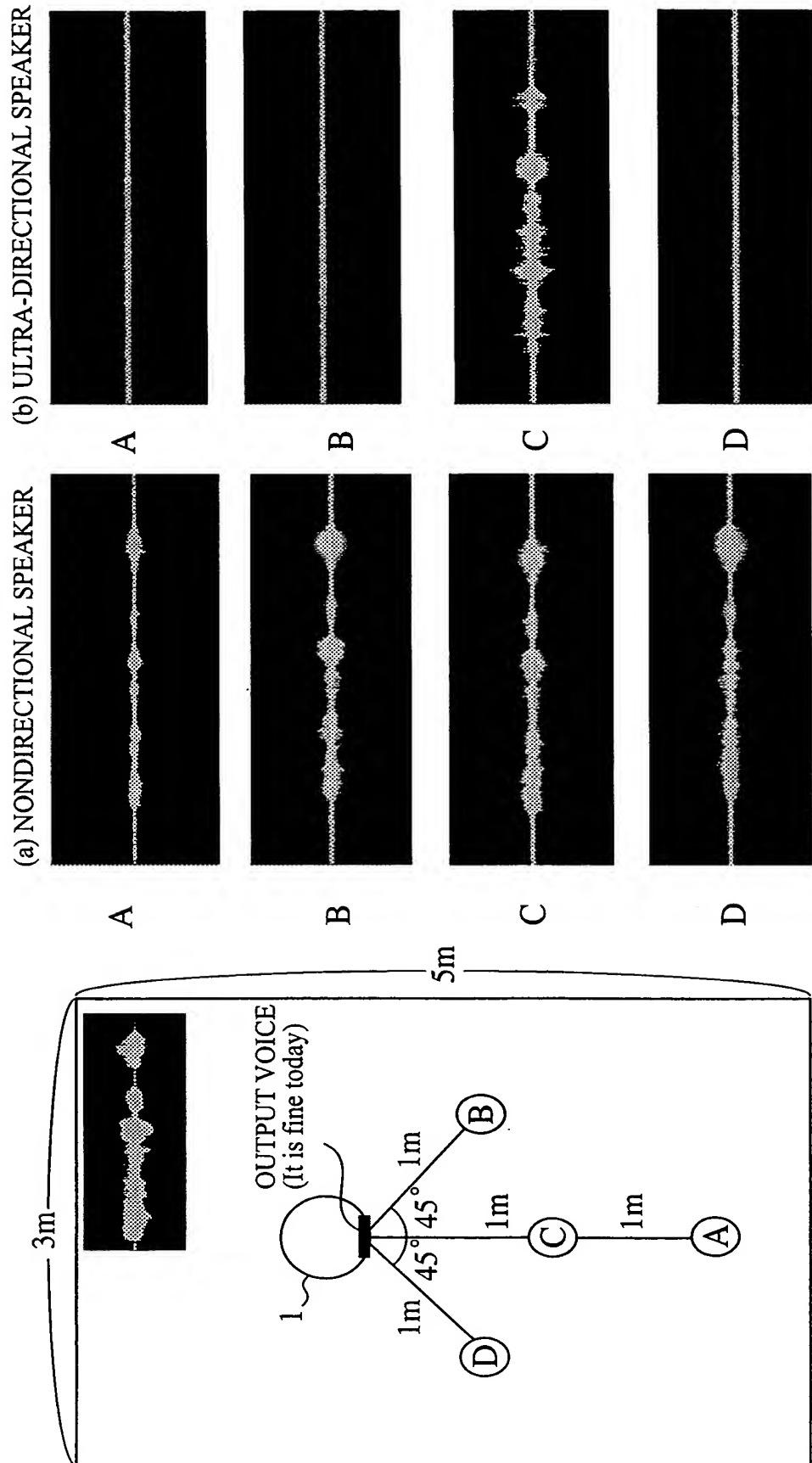


FIG.10

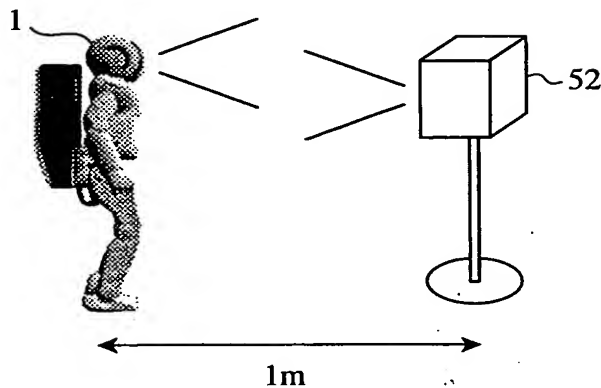


FIG.11

ROBOT-SIDE SPEAKER		
NONDIRECTIONAL SPEAKER	70dBA	62dBA
ULTRA-DIRECTIONAL SPEAKER (MAXIMUM OUTPUT)	58dBA	70dBA
ULTRA-DIRECTIONAL SPEAKER (GAIN CONTROL)	56dBA	62dBA
SWITCHING ON OF ROBOT	55dBA	51dBA
BACKGROUND NOISE	23dBA	23dBA

FIG.12

